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- 1. A method for detecting a senescent cell, which comprises measuring a relative alteration to young cell in a signal or molecular species involved in signal transduction, wherein the alteration in signal or molecular species is one or more selected from the group consisting of:
 - (a) a reduction in Ca²⁺ oscillation;
 - (b) a reduction in expression of F-actin;
 - (c) a reduction in activity of phospholipase C;
- 10 (d) a reduction in activity of phospholipase D;
 - (e) a reduction in expression or phosphorylation of plateletderived growth factor receptor;
 - (f) a reduction in phosphorylation of phospholipase C-yl;
 - (g) a reduction in expression of phospholipase D 1;
 - (h) a reduction in expression of EDG-2;
 - (i) a reduction in expression of EDG-7;
 - (j) a reduction in expression of Gil;
 - (k) a reduction in expression of Gi2;
 - (1) a reduction in expression of Gi3;
- (m) an increase in activity or expression of adenylyl cyclase;
 - (n) a reduction in activity or expression of
 phophodiesterase;
 - (o) an increase in activity of protein kinase C;
- 25 (p) an increase in activity or expression of protein kinase

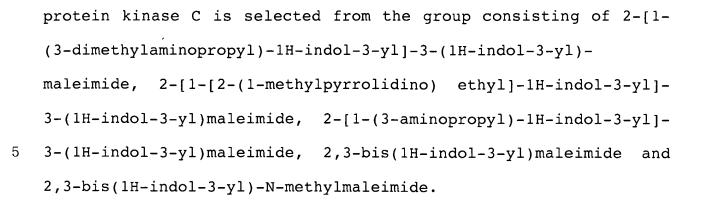
Α;

- (q) an increase in phosphorylation of CREB; and
- (r) an increase in cAMP content.
- 5 2. The method according to claim 1, wherein the signals or molecular species of (a)-(g) are involved in signal transduction triggered by platelet-derived growth factor.
- 3. The method according to claim 1, wherein the signals or 10 molecular species of (h)-(r) are involved in signal transduction triggered by lysophosphatidic acid.
 - 4. The method according to claim 1, wherein the senescent cell is derived from human cell.
 - 5. The method according to claim 4, wherein the human cell is fibroblast.
- 6. The method according to claim 3, wherein the adenylyl cyclase with increased expression in senescent cell is adenylyl cyclase II, adenylyl cyclase IV or adenylyl cyclase VI.
 - 7. The method according to claim 3, wherein the phophodiesterase with reduced expression in senescent cell is phophodiesterase 4B.

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- 8. The method according to claim 3, wherein the protein kinase A with increased expression in senescent cell is Ca, RIa or RI β subunit thereof.
- 9. A method for modulating cellular senescence comprising treating a senescent cell with the effective amount of an inhibitor of adenylyl cyclase, an inhibitor of protein kinase A, an inhibitor of protein kinase C or an activator of Gi protein.
- 10. The method according to claim 9, wherein the inhibitor of adenylyl cyclase is selected from the group consisting of 2',5'-dideoxyadenosine, cis-N-(2-phenylcyclopentyl)azacyclotridec-1-en-2-amine and 9-(tetrahydro-2'-furyl)adenine.
- 11. The method according to claim 9, wherein the inhibitor of protein kinase A is selected from the group consisting of adenosine 3',5'-cyclic phosphorothiolate, 8-bromo-adenosine 3',5'-cyclic monophosphorothioate, 4-cyano-3-methylisoquinoline, 1-(5-isoquinolinesulfonyl)-2-methylpi
- perazine, N-[2-(methylamino)ethyl]-5-isoquinolinesulfonam

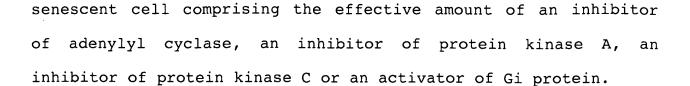
 ide, isoquinolinesulfonamide, N-(2-aminoethyl)-5isoquinolinesulfonamide, N-[2-((p-bromocinnamy)amino)ethy l]-5isoquinolinesulfonamide and (5-isoquinolinesul fonyl)piperazine.
- 25 12. The method according to claim 9, wherein the inhibitor of



- 13. The method according to claim 9, wherein the activator of Gi is selected from protein the group consisting of N_6- 10 cyclopentyladenosine, 5-chloro-N₆-adenosine, 2 - [p - (2 carboxyethyl) phenethylamino]-5'-N-ethylcarboxamido adenosine, oxymetazoline, prazosin, 2-[2-[4-(2-methoxyphenyl)-1piperazinyl]ethyl]-4,4-dimethyl-(2H,4H)-isoquinoline-1,3-dione, MGSA, cannibinol, 3-aminopropylphosphinic acid, 15 quisqualate, sumatriptan, melatonin, (5,7,8)-(-)-N-methyl-[7-(1pyrrolidinyl)-1-oxaspiro(4,5)dec-8-yl]benzeneacetamide and pertussis toxin.
- 14. The method according to claim 9, wherein the senescent cell 20 is derived from human cell.
 - 15. The method according to claim 12, wherein the human cell is fibroblast.
- 25 16. A composition for modulating cellular senescence of a

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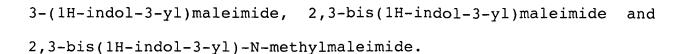
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- 5 17. The composition according to claim 16, wherein the inhibitor of adenylyl cyclase is selected from the group consisting of 2',5'-dideoxyadenosine, cis-N-(2-phenylcyclopentyl)azacyclotridec-1-en-2-amine and 9-(tetrahydro-2'-furyl)adenine.
- 18. The composition according to claim 16, wherein the inhibitor of protein kinase A is selected from the group consisting of adenosine 3',5'-cyclic phosphorothiolate, 8-bromo-adenosine 3',5'-cyclic monophosphorothioate, 4-cyano-3-methylisoquinoline, 1-(5-isoquinolinesulfonyl)-2-methylpiperazine, N-[2-(methylamino)ethyl]-5-isoquinoline sulfonamide, N-(2-aminoethyl)-5-isoquinolinesulfonamide, N-[2-((p-bromocinnamy) amino)ethyl]-5-isoquinolinesulfonamide, N-[2-((p-bromocinnamy) amino)ethyl]-5-
- 19. The composition according to claim 16, wherein the inhibitor of protein kinase C is selected from the group consisting of 2[1-(3-dimethylaminopropyl)-1H-indol-3-yl]-3-(1H-indol-3-yl)maleimide, 2-[1-[2-(1-methylpyrrolidino) ethyl]-1H-indol-3-yl]
 25 3-(1H-indol-3-yl)maleimide, 2-[1-(3-aminopropyl)-1H-indol-3-yl]-

isoquinolinesulfonamide and (5-isoquino linesulfonyl)piperazine.

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- 20. The composition according to claim 16, wherein the activator 5 of Gi protein is selected from the group consisting of N_{6} cyclopentyladenosine, 5-chloro-N₆-adenosine, 2 - [p - (2 carboxyethyl) phenethylamino]-5'-N- ethylcarboxamidoadenosine, oxymetazoline, prazosin, 2-[2-[4-(2-methoxyphenyl)-1piperazinyl]ethyl]-4,4-dimethyl-(2H,4H)-isoquinoline-1,3-dione, 10 cannibinol, MGSA, 3-aminopropylphosphinic acid, quisqualate, sumatriptan, melatonin, (5,7,8)-(-)-N-methyl-[7-(1pyrrolidinyl)-1-oxaspiro(4,5)dec-8-yl]benzeneacetamide pertussis toxin.
- 15 21. The composition according to claim 16, wherein the senescent cell is derived from human cell.
 - 22. The composition according to claim 21, wherein the human cell is fibroblast.
 - 23. A method for modulating cellular senescence in a patient in need thereof, comprising administering to the patient the effective amount of an inhibitor of adenylyl cyclase, an inhibitor of protein kinase A, an inhibitor of protein kinase C or an activator of Gi protein.



24. The method according to claim 23, wherein the inhibitor of adenylyl cyclase is selected from the group consisting of 2',5'-dideoxyadenosine, cis-N-(2-phenylcyclopentyl)azacyclotridec-1-en-2-amine and 9-(tetrahydro-2'-furyl)adenine.

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25. The method according to claim 23, wherein the inhibitor of protein kinase A is selected from the group consisting of adenosine 3',5'-cyclic phosphorothiolate, 8-bromo-adenosine 3',5'-cyclic monophosphorothioate, 4-cyano-3-methylisoquinoline, 1-(5-isoquinolinesulfonyl)-2-methylpiperazine, N-[2-(methylamino)ethyl]-5-isoquinolinesulfonamide, N-(2-aminoethyl)-5-isoquinolinesulfonamide, N-(2-aminoethyl)-5-isoquinolinesulfonamide, N-[2-((p-bromocinnamy)amino)ethyl]-5-isoquinolinesulfonamide and (5-isoquinolinesulfonyl)piperazine.

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- 26. The method according to claim 23, wherein the inhibitor of protein kinase C is selected from the group consisting of 2-[1-(3-dimethylaminopropyl)-1H-indol-3-yl]-3-(1H-indol-3-yl)-maleimide, 2-[1-[2-(1-methylpyrrolidino) ethyl]-1H-indol-3-yl]-3-(1H-indol-3-yl)maleimide, 2-[1-(3-aminopropyl)-1H-indol-3-yl]-3-(1H-indol-3-yl)maleimide, 2,3-bis(1H-indol-3-yl)maleimide and 2,3-bis(1H-indol-3-yl)-N-methylmaleimide.
- 27. The method according to claim 23, wherein the activator of 25 Gi protein is selected from the group consisting of $^{N_6-}$



cyclopentyladenosine, 5-chloro- N_6 -adenosine, 2 - [p - (2 carboxyethyl) phenethylamino]-5'-N-ethylcarboxamido adenosine, 2-[2-[4-(2-methoxyphenyl)-1oxymetazoline, prazosin, piperazinyl]ethyl]-4,4-dimethyl-(2H,4H)-isoquinoline-1,3-dione, cannibinol, MGSA, 3-aminopropylphosphinic acid, galanin, quisqualate, sumatriptan, melatonin, (5,7,8)-(-)-N-methyl-[7-(1-)]pyrrolidinyl)-1-oxaspiro(4,5)dec-8-yl]benzeneacetamide pertussis toxin.

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